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ABSTRACT

This guide provides an outline of the skills required to pass the flight test for a Private Pilot Certificate with Airplane Rating under part 61 (revised) of Federal Aviation Regulations. General procedures for flight tests are described and the following pilot operations outlined: preflight operations, airport and traffic pattern operations, flight maneuvering by reference to ground objects, flight at critically low speeds, takeoffs and landings, maneuvering by reference to instruments, cross country flying, maximum performance takeoffs and landings, night flying - night VFR navigation, and emergency operations. Under each heading the objective, procedures and maneuvers are outlined, followed by descriptions and acceptable performance guidelines for each item. The guide is intended to aid both applicant and instructor and assist FAA inspectors and designated pilot examiners in the conduct and standardization of flight tests. (SA)

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AC 61-54

FLIGHT TEST GUIDE

[Part 61 Revised]

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PRIVATE PILOT

Airplane

CE 000 019

1973

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

FAA-G-8082-2

FLIGHT TEST GUIDE

[Part 61 Revised]

PRIVATE PILOT

Airplane

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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
FLIGHT STANDARDS SERVICE

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PREFACE

Part 61 (revised) of Federal Aviation Regulations, effective 1 November 1973, establishes a new concept of pilot training and certification requirements. To provide a transition to these revised requirements, Part 61 (revised) permits the applicant, for a period of 1 year after the effective date, to meet either the previous requirements or those contained in the revised part. AC 61–3B, Private Pilot Test Guide, dated 1968, outlines the previous requirements.

This flight test guide, AC 61–54, has been prepared by Flight Standards Service of the Federal Aviation Administration to assist the applicant and his instructor in preparing for the flight test for the Private Pilot Certificate with Airplane Rating under Part 61 (revised). It contains information and guidance concerning the pilot operations, procedures, and maneuvers relevant to the flight test required for that certificate. A suggested flight test checklist is included for the convenience of those who may find such a checklist useful.

In addition to providing help to the applicant and his instructor, this guide will be useful to FAA Inspectors and designated pilot examiners in the conduct and standardization

of flight tests. Persons using this guide in connection with private pilot training and flight tests should also refer to the applicable *Federal Aviation Regulations; Airman's Information Manual; Flight Training Handbook,* AC 61–21; and other pertinent advisory circulars.

Comments regarding this guide may be directed to Department of Transportation, Federal Aviation Administration, Flight Standards Technical Division, P.O. Box 25082. Oklahoma City, Oklahoma 73125.

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APPLICANT'S FLIGHT TEST CHECKLIST

(Suggested)

APPOINTMENT WITH INSPECTOR

OR EXAMINER: Name _____

Time/Date _____

ACCEPTABLE AIRPLANE WITH DUAL CONTROLS

- ☐ View-limiting device
- ☐ Aircraft Documents:
  - Airworthiness Certificate
  - Registration Certificate
  - Operating Limitations
- ☐ Aircraft Maintenance Records:
  - Airworthiness Inspections
- ☐ FCC Station License

PERSONAL EQUIPMENT

- ☐ Current Aeronautical Charts
- ☐ Computer and Plotter
- ☐ Flight Plan Form
- ☐ Flight Logs
- ☐ Current AIM

PERSONAL RECORDS

- ☐ Pilot Certificate
- ☐ Medical Certificate
- ☐ Signed Recommendation
- ☐ Written Test Results
- ☐ Logbook
- ☐ Notice of Disapproval (if applicable)
- ☐ Approved School Graduation Certificate (if applicable)
- ☐ FCC Radiotelephone Operator Permit
- ☐ Examiner's Fee (if applicable)

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GENERAL INFORMATION

PILOT TRAINING AND CERTIFICATION CONCEPT

Part 61 of the Federal Aviation Regulations has been revised and upgraded to reflect the complexity of the modern aircraft as well as its operating environment. In the past, airman certification requirements could be met by training a student to pass a written test and then to demonstrate his ability to perform predetermined flight training maneuvers during a flight test. Rather than merely duplicating on the flight test the maneuvers used for training, the new training and certification concept requires that the applicant receive instruction in and demonstrate his competency in *all pilot operations* listed in pertinent sections of Part 61 (revised). A pilot operation, as used herein, is a group of related procedures and maneuvers involving skills and knowledge required to safely and efficiently function as a pilot. The specific procedures and maneuvers used to teach the pilot operations are not listed in Part 61 (revised). Instead, the instructor is permitted to select procedures and maneuvers from FAA-approved training publications pertinent to the certificate or rating sought.

The instructor indicates by logbook endorsement that the applicant has demonstrated competency in all the required pilot operations and considers him qualified to pass the flight test. On the flight test, the examiner[1] selects the procedures and maneuvers to be performed by the applicant to show competency in each required pilot operation.

The procedures and maneuvers appropriate to the Private Pilot Certificate with an airplane rating are contained in *AC 61-21, Flight Training Handbook.*

USE OF THIS GUIDE

The pilot operations in this flight test guide, indicated by Roman numerals, are required by Section 61.107 of Part 61 (revised). This guide is intended only to outline appropriate pilot operations and the minimum standards for the performance of each procedure or maneuver which will be accepted by the examiner as evidence of the pilot's competency. It is not intended that the applicant be tested on every procedure or maneuver within each pilot operation, but only those considered necessary by the examiner to determine competency in each pilot operation.

When, in the judgment of the examiner, certain demonstrations are impractical (for

[1] The word "examiner" is used hereafter in this guide to denote either the Federal Aviation Administration Inspector or designated pilot examiner who conducts an official flight test.

example, night flying), competency may be determined by oral testing.

This guide contains an ***Objective*** for each required pilot operation. Under each pilot operation, pertinent procedures or maneuvers are listed with ***Descriptions*** and ***Acceptable Performance Guidelines***.

1. The ***Objective*** states briefly the purpose of each pilot operation required on the flight test.
2. The ***Description*** provides information on what may be asked of the applicant regarding the selected procedure or maneuver. The procedures or maneuvers listed have been found most effective in demonstrating the objective of that particular pilot operation.
3. The ***Acceptable Performance Guidelines*** include the factors which will be taken into account by the examiner in deciding whether the applicant has met the objective of the pilot operation. The airspeed, altitude, and heading tolerances given represent the minimum performance expected in good flying conditions. However, consistently exceeding these tolerances before corrective action is initiated is indicative of an unsatisfactory performance. Any procedure or action, or the lack thereof, which requires the intervention of the examiner to maintain safe flight will be disqualifying. Failure to exercise proper vigilance or to take

positive action to ensure that the flight area has been adequately cleared for conflicting traffic will also be disqualifying.

Emphasis will be placed on procedures, knowledge, and maneuvers which are most critical to a safe performance as a pilot. The demonstration of prompt stall recognition, adequate control, and recovery techniques will receive special attention. Other areas of importance include spatial disorientation, collision avoidance, and wake turbulence hazards.

The applicant will be expected to know the meaning and significance of the airplane performance speeds important to the pilot, and be able to readily find these speeds for the airplane used for the flight test. These speeds include:

V_{so} – the stalling speed or minimum steady flight speed in landing configuration.
V_y – the speed for the best rate of climb.
V_x – the speed for the best angle of climb.
V_a – the design maneuvering speed.
V_{ne} – the never exceed speed.

In the event the private pilot flight test is taken in a multiengine airplane, the Description and Acceptable Performance Guidelines found in Section 1 of AC 61-57, the Multiengine Airplane Class and Type Rating Flight Test Guide, will be used for each re-

quired maneuver *which is performed differently in multiengine airplanes*, rather than those in this guide.

GENERAL PROCEDURES FOR FLIGHT TESTS

The ability of an applicant for a private or commercial pilot certificate, or for an aircraft or instrument rating on that certificate, to perform the required pilot operations is based on the following:

1. Executing procedures and maneuvers within the aircraft's performance capabilities and limitations, including use of the aircraft's systems.
2. Executing emergency procedures and maneuvers appropriate to the aircraft.
3. Piloting the aircraft with smoothness and accuracy.
4. Exercising judgment.
5. Applying his aeronautical knowledge.
6. Showing that he is the master of the aircraft, with the successful outcome of a procedure or maneuver never seriously in doubt.

If the applicant fails any of the required pilot operations he fails the flight test. The examiner or the applicant may discontinue the test at any time when the failure of a required pilot operation makes the applicant ineligible for the certificate or rating sought. If the test is discontinued the applicant is

entitled to credit for only those entire pilot operations that he has successfully performed.

FLIGHT TEST PREREQUISITES

An applicant for the private pilot flight test is required by revised Section 61.39 of the Federal Aviation Regulations to have: (1) passed the appropriate private pilot written test within 24 months before the date he takes the flight test, (2) the applicable instruction and aeronautical experience prescribed for a private pilot certificate, (3) a first, second, or third class medical certificate issued within the past 24 months, (4) reached at least 17 years of age, and (5) a written statement from an appropriately certificated flight instructor certifying that he has given the applicant flight instruction in preparation for the flight test within 60 days preceding the date of application, and finds him competent to pass the test and to have a satisfactory knowledge of the subject areas in which he is shown to be deficient by his airman written test report.

AIRPLANE AND EQUIPMENT REQUIREMENTS FOR FLIGHT TEST

The applicant is required by revised Section 61.45 to provide an airworthy airplane for the flight test. This airplane must be capable of, and its operating limitations must not prohibit, the pilot operations required in

the test. The following equipment is relevant to the pilot operations required by revised Section 61.107 for the private pilot flight test:

1. Two-way radio suitable for voice communications with aeronautical ground stations.

2. A radio receiver which can be utilized for available radio navigation facilities (may be the same radio used for communications).

3. Appropriate flight instruments for the control of the airplane during instrument conditions. Appropriate flight instruments are considered to be those required by FAR Part 91 for flight under instrument flight rules.

4. Engine and flight controls that are easily reached and operated in a normal manner by both pilots.

5. A suitable view-limiting device, easy to install and remove in flight, for simulating instrument flight conditions.

6. Operating instructions and limitations. The applicant should have an appropriate checklist, an Owner's Manual/Handbook, or, if required for the airplane used, an FAA approved Airplane Flight Manual. Any operating limitations or other published recommendations of the manufacturer that are applicable to the specific airplane will be observed.

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PILOT OPERATIONS

Procedures/Maneuvers

I. PREFLIGHT OPERATIONS

Objective

To determine that the applicant can ensure that he meets pilot requirements, that the airplane is airworthy and ready for safe flight, and that suitable weather conditions exist.

Procedures/Maneuvers

A. Certificates and Documents

1. Description The applicant may be asked to present his pilot and medical certificates and to locate and explain the airplane's registration certificate, airworthiness certificate, operating manual or FAA approved Airplane Flight Manual (if required), equipment list, and required weight and balance data. In addition, he is expected to be able to explain the airplane and engine logbooks or other maintenance records.

2. Acceptable Performance Guidelines The applicant shall be knowledgeable regarding the location, purpose, and significance of each required item.

B. Airplane Performance and Limitations

1. Description The applicant may be orally quizzed on the performance capabilities, approved operating procedures, and limitations of the airplane used. This includes power settings, placarded speeds, and fuel and oil requirements. In addition, the manufacturer's published recommendations or FAA approved Airplane Flight Manual should be used to determine the effects of temperature, pressure altitude, wind, and gross weight on performance.

2. Acceptable Performance Guidelines The applicant shall be evaluated on his ability to obtain, explain, and apply the information which is essential in determining the performance of the airplane used.

C. Weight and Balance

1. Description The applicant may be asked to demonstrate the application of the approved weight and balance data for the airplane used to determine that the gross weight and c.g. (center of gravity) location are within limits. Charts and graphs provided by the manufacturer may be used.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his ability to determine the empty weight, maximum gross weight, useful load (fuel, passengers, baggage) by reference to appropriate publications, and his ability to apply this information

to determine that the gross weight and c.g. are within approved limits.

D. Weather Information

1. Description The applicant may be asked to obtain Aviation Weather Reports, Area and Terminal Forecasts, and Winds Aloft Forecasts pertinent to the proposed flight.

2. Acceptable Performance Guidelines The applicant shall demonstrate that he knows what weather information is pertinent and how to best obtain this information, and that he can interpret and understand its significance with respect to his proposed flight.

E. Line Inspection

1. Description The applicant may be asked to demonstrate a visual check to determine the airplane's airworthiness and readiness for flight. This includes all required equipment and documents. A checklist provided by the manufacturer or operator should be used.

2. Acceptable Performance Guidelines The applicant shall use an orderly procedure in conducting a preflight check of the airplane. He shall know the significance of each item checked and recognize any unsafe condition.

F. Airplane Servicing

1. Description The applicant may be asked to demonstrate a visual inspection to determine that the fuel is of the proper grade and type and the supply of fuel, oil, and other required fluids is adequate for the proposed flight. He should take appropriate action to eliminate possible fuel contamination in the airplane.

2. Acceptable Performance Guidelines The applicant shall know the grade and type of oil and fuel specified for the airplane and be able to determine the amount of fuel required to complete the flight. He shall know where to find all fuel and oil fillers, and the capacity of each tank, as well as the location of the battery, hydraulic fluid reservoirs, anti-icing fluid tanks, etc. He shall also know the proper steps for avoiding fuel contamination during and following servicing.

G. Engine and Systems Preflight Check

1. Description The applicant may be asked to demonstrate a check to determine that the engine is operating within acceptable limits and that all systems, equipment, and controls are functioning properly and adjusted for takeoff. A checklist provided by the manufacturer or operator should be used.

2. Acceptable Performance Guidelines The applicant shall use proper procedures in engine starting and runup and in

checking airplane systems, equipment, and controls to determine that the airplane is ready for flight. Careless operation in close proximity to obstructions, ground personnel, or other aircraft shall be disqualifying.

II. AIRPORT AND TRAFFIC PATTERN OPERATIONS

Objective

To determine that the applicant is able to safely and efficiently conform to arrival and departure procedures and established traffic patterns at controlled and noncontrolled air ports during day and night VFR operations.

Procedures/Maneuvers

A. Radio Communication and ATC Light Signals

1. Description The applicant may be asked to demonstrate the use of designated frequencies and recommended voice procedures to report position and state intentions regarding the flight, and to obtain pertinent information and clearances. Where applicable, he is expected to use Airport Terminal Information Service, Airport Advisory Service, Control Tower, Approach and Departure Control, UNICOM, and ATC light signals.

2. Acceptable Performance Guidelines The applicant shall determine the type of communication facilities available, select correct frequencies, and use appropriate

communications procedures to obtain and acknowledge necessary information. Failing to comply with airport traffic procedures or instructions without permission to do so shall be disqualifying.

B. Airport and Runway Markings and Lighting

1. Description Where available, the applicant may be asked to demonstrate the proper use of wind and traffic direction indicators, and markings indicating closed runways, displaced thresholds, taxiways, holding lines, and basic runways. He is also expected to be familiar with taxiway and runway lighting, rotating beacons, obstruction lights, and VASI (Visual Approach Slope Indicator).

2. Acceptable Performance Guidelines The applicant shall know the meaning of standard wind and traffic indicators, markings and lighting, and how they relate to airplane operation. Failure to properly use these aids, creating an unsafe situation, shall be disqualifying.

C. Operations on the Surface

1. Description The applicant may be asked to demonstrate safe operating practices while in close proximity to other aircraft, persons, or obstructions. Emphasis should be placed on use of brakes and power to control taxi speeds, proper positioning of flight controls for existing wind conditions, awareness of possible ground hazards, and

compliance with taxi procedures and instructions. The applicant is expected to take extra precautions when taxiing behind large aircraft.

2. Acceptable Performance Guidelines The applicant shall maneuver the airplane on the surface without endangering persons or property or conflicting with a smooth and orderly flow of traffic.

D. Traffic Patterns

1. Description The applicant may be asked to demonstrate prescribed arrival and departure procedures. He is expected to maintain appropriate altitudes, airspeeds, and ground track consistent with instructions received or the established traffic pattern.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his ability to maneuver the airplane relative to the runway in use. Consideration shall be given to application of wind drift corrections, adequate spacing in relation to other aircraft, and maintaining and controlling altitude and airspeed. Deviation of ± 100 ft. from prescribed traffic pattern altitudes or ± 10 knots from recommended airspeeds shall be considered disqualifying unless corrected promptly.

E. Collision Avoidance Precautions

1. Description The applicant is expected to exercise conscientious and continuous surveillance of the airspace in which

the airplane is being operated to guard against potential mid-air collisions. In addition to "see and avoid" practices, he is expected to use VFR Advisory Service at nonradar facilities, Airport Advisory Service at nontower airports or FSS locations, and Radar Traffic Information Service, where available.

2. Acceptable Performance Guidelines The applicant shall maintain continuous vigilance for other aircraft and take immediate actions necessary to avoid any situation which could result in a mid-air collision. Extra precautions shall be taken, particularly in areas of congested traffic, to ensure that his view of other aircraft is not obstructed by his airplane's structure. When traffic advisory service is used, the applicant shall understand terminology used by the radar controller in reporting positions of other aircraft. Failure to maintain proper surveillance shall be disqualifying.

F. Wake Turbulence Avoidance

1. Description The applicant may be asked to explain how, where, and when wingtip vortices are generated and their characteristics and associated hazards. He should follow recommended courses of action to remain clear of these hazards.

2. Acceptable Performance Guidelines The applicant shall identify the conditions and locations in which wingtip vortices may be encountered and adjust his flight path

so as to avoid these areas. Failure to follow recommended procedures for minimizing the likelihood of flying into wingtip vortices shall be disqualifying.

III. FLIGHT MANEUVERING BY REFERENCE TO GROUND OBJECTS

Objective

To determine that the applicant is able to maneuver the airplane at approximately traffic pattern altitude over a predetermined ground path while dividing his attention inside and outside the airplane.

Procedures/Maneuvers

A. "S" Turns Across a Road

1. Description The applicant may be asked to demonstrate a series of "S" turns across a straight ground reference line approximately perpendicular to the wind. He is expected to plan bank variations to compensate for wind so that each half circle is equal on opposite sides of the line. At each reversal of direction, he should cross the line at a 90° angle with the wings level. A constant altitude should be maintained throughout the maneuver.

2. Acceptable Performance Guidelines The applicant shall readily select ground references and maneuver the airplane in relation to these references. Properly coordinated turns, smooth control usage, and

division of attention shall be required. Deviation of ±100 ft. from the selected altitude shall be considered disqualifying unless corrected promptly. Also, excessively steep banks, flight below minimum safe altitudes prescribed by Regulations, or inadequate clearance of other aircraft shall be disqualifying.

B. Eights Along a Road or Eights Across a Road

1. Description The applicant may be asked to maneuver along a ground track starting above and parallel to a road, then perform a 360° turn in each direction. He is expected to vary the bank to correct for wind so as to arrive back over the road at the starting point upon completion of each 360° turn. The ground track should be in the form of a figure "8".

The applicant may be asked to perform a similar ground track maneuver starting over the intersection of two roads or some point on a road. The turns should be made so the intersection or point, which forms the center of the "8", is crossed in straight-and-level flight. A constant altitude should be maintained throughout the maneuver.

2. Acceptable Performance Guidelines The applicant shall maneuver the airplane so the loops of the "8" are symmetrical. Performance shall be evaluated on the basis of proper wind drift correction, airspeed control, coordination, altitude control, and

vigilance for other aircraft. Deviation of ±100 ft. from the selected altitude shall be considered disqualifying unless corrected promptly. Also, excessively steep banks, flight below minimum safe altitude prescribed by Regulations, or inadequate clearance of other aircraft shall be disqualifying.

C. Rectangular Course

1. Description The applicant may be asked to follow a rectangular or square course around and outside of a selected area. He is expected to correct for wind drift so the ground track is parallel to the sides of the selected area and equidistant from each side. A constant altitude should be maintained throughout the maneuver. This pattern should be performed both to the right and to the left.

2. Acceptable Performance Guidelines The applicant shall readily select the ground reference and maintain the desired track in relation to that reference. Properly coordinated turns, smooth control usage, and division of attention shall be required. Deviation of ±100 ft. from the selected altitude shall be considered disqualifying unless corrected primply. Also, excessive maneuvering to correct for wind drift, flight below minimum safe altitude prescribed by Regulations, or inadequate clearance from other aircraft shall be disqualifying.

D. Turns About a Point

1. Description The applicant may be asked to perform a ground track maneuver in which a constant radius of turn is maintained by varying the bank to compensate for wind drift, so as to circle and maintain a uniform distance from a prominent reference point on the ground. A constant altitude should be maintained throughout the maneuver. This maneuver should be performed both to the right and to the left.

2. Acceptable Performance Guidelines The applicant shall maneuver the airplane so that the ground track is a constant distance from the reference point. Performance shall be evaluated on the basis of proper wind drift correction, airspeed control, coordination, altitude control, and vigilance for other aircraft. Deviation of more than ± 100 ft. from the selected altitude shall be considered disqualifying unless corrected promptly. Also, excessively steep banks, flight below minimum safe altitude prescribed by Regulations, or inadequate clearance from other aircraft shall be disqualifying.

E. Eights Around Pylons

1. Description The applicant may be requested to perform right and left turns around two ground reference points or pylons. A turn should be made in each direction, varying bank to correct for wind drift, resulting in a constant distance from each point.

The ground track should be in the form of a figure "8".

2. *Acceptable Performance Guidelines* The applicant shall maneuver the airplane so that both loops of the "8" are of equal size. Performance shall be evaluated on proper wind drift correction, airspeed control, coordination, altitude control, and ... nce for other aircraft. Deviation of ±100 ft. from the selected altitude shall be considered disqualifying unless corrected promptly. Also, excessively steep banks, flight below minimum safe altitude prescribed by Regulations, or inadequate clearance from other aircraft shall be disqualifying.

IV. FLIGHT AT CRITICALLY SLOW AIRSPEEDS

Objective

To determine that the applicant understands the reason for and can recognize changes in the airplane flight characteristics at critically slow airspeeds in various attitudes and configurations. To determine that the applicant can recognize imminent and full stalls and can accomplish prompt, positive, and effective recoveries in all normally anticipated situations.

Procedures/Maneuvers

A. Maneuvering at Minimum Controllable Airspeed

1. Description The applicant may be asked to maneuver in various configurations

and at such airspeeds that controllability is minimized to the point that if the angle of attack is further increased by an increase in load factor or a decrease in airspeed, an immediate stall would result. The maneuver should be accomplished in medium-banked level, climbing and descending turns, as well as in straight-and-level flight.

2. Acceptable Performance Guidelines The applicant shall be evaluated on his ability to establish the minimum controllable airspeed, to positively control the airplane, and to recognize incipient stalls. Primary emphasis shall be placed on airspeed control. During straight-and-level flight at this speed, the applicant shall maintain altitude within ± 100 ft. and heading within $\pm 10°$ of that assigned by the examiner. Inadequate surveillance of the area prior to and during the maneuver or an unintentional stall shall be disqualifying.

B. Imminent Stalls

1. Description The applicant may be asked to demonstrate recoveries from imminent stalls entered from straight flight and from turning flight with power-on or power-off. He is expected to place the airplane in the attitude and configuration appropriate for flight situations such as takeoffs, departures, landing approaches, and accelerated maneuvers, as directed by the examiner. The applicant should apply control pressures which

result in an increase in angle of attack until the first buffeting or decay of control effectiveness is noted. The recovery should be accomplished immediately by reducing the angle of attack with coordinated use of flight and power controls.

2. Acceptable Performance Guidelines The applicant shall recognize the indications of an imminent stall and take prompt, positive control action to prevent a full stall. The applicant shall be disqualified if a full stall occurs or if it becomes necessary for the examiner to take control of the airplane to avoid excessive airspeed, excessive loss of altitude, or a spin.

C. Full Stalls

1. Description The applicant may be asked to demonstrate recoveries from full stalls entered from straight flight and from turning flight with power-on or power-off. He is expected to establish the attitude and configuration for flight situations such as takeoffs and departures, landing approaches, and accelerated maneuvers. Then he should increase the angle of attack smoothly until a stall occurs, as indicated by a sudden loss of control effectiveness or uncontrollable pitching. Recovery should be accomplished by reducing the angle of attack immediately, and positively regaining normal flight attitude with coordinated use of flight and power controls. The applicant is expected to be aware

of the loss of altitude necessary to recover from a stabilized high rate of descent with the elevator control fully back, if this condition is encountered before a stall develops.

2. *Acceptable Performance Guidelines* The applicant shall recognize when the stall has occurred and take prompt action to prevent a prolonged stalled condition. The applicant shall be disqualified if a secondary stall occurs or if it becomes necessary for the examiner to take control of the airplane to avoid excessive airspeed, excessive loss of altitude, or a spin.

V. TAKEOFFS AND LANDINGS

Objective

To determine that the applicant can accomplish safe takeoffs and landings under all normally anticipated conditions in a landplane or in a seaplane.

Procedures/Maneuvers

A. Normal and Crosswind Takeoffs (Landplanes)

1. Description The applicant may be asked to demonstrate normal and crosswind takeoffs by aligning the airplane with the runway or takeoff surface and applying takeoff power smoothly and positively while maintaining directional control. In crosswind takeoffs he is expected to hold aileron into the wind and maintain a straight takeoff path by use of rudder and to gradually establish

a pitch attitude which produces an angle of attack that permits normal acceleration and lift off.

The applicant may be asked to make at least one crosswind takeoff with sufficient crosswind to require the use of crosswind techniques, but not in excess of the crosswind limitations of the airplane used.

2. Acceptable Performance Guidelines The applicant's performance of normal and crosswind takeoffs shall be evaluated on the basis of power application, smoothness, wind drift correction, coordination, and directional control. The applicant shall maintain climb speed within ±5 knots of the desired initial climb speed after liftoff.

B. Normal and Crosswind Landings (Landplanes)

1. Description The applicant may be asked to demonstrate normal and crosswind landings using a final approach speed equal to 1.3 times the stalling speed in landing configuration (1.3 V_{s0}), or the final approach speed prescribed by the manufacturer. He should progressively reduce power so that the throttle is closed when the desired touchdown point is assured, or while rounding-out for touchdown. If the airplane is equipped with flaps, landings may be made with full flaps, partial flaps, or no flaps. Forward slips and a slip-to-a-landing may be performed with or

without flaps, unless prohibited by the airplane's operating limitations.

In a tailwheel type airplane, the main wheels and tailwheel should touch the runway simultaneously at or near power-off stalling speed. In a nosewheel type airplane, the touchdown should be on the main wheels with little or no weight on the nosewheel. In strong, gusty surface winds, in a tailwheel type airplane, the round-out should be made to an attitude which permits touchdown on the main wheels only. In crosswind conditions, wind drift corrections should be made throughout the final approach and touchdown. Adequate corrections and positive directional control should be maintained during the after-landing roll.

The applicant may be asked to make at least one crosswind landing with sufficient crosswind to require the use of crosswind techniques, but not to exceed the crosswind limitations of the airplane.

2. *Acceptable Performance Guidelines* The applicant's performance of normal and crosswind landings shall be evaluated on the basis of his landing technique, judgment, wind drift correction, coordination, power technique, and smoothness. He shall maintain the proper final approach speed within ± 5 knots and touch down in the proper landing attitude within the portion of the runway or landing area specified by the examiner.

Touching down with an excessive side load on the landing gear and poor directional control shall be disqualifying.

C. Seaplane Taxiing

1. Description The applicant may be asked to demonstrate taxiing at slow speeds and on the step, into the wind, downwind, and crosswind. Turns to downwind headings, step turns, sailing, docking, and simulated or actual approaches to a buoy should be included. The applicant should demonstrate taxiing with and without the use of a water rudder, if the seaplane is so equipped.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his proper use of flight controls, power, and water rudder to safely and effectively maneuver the seaplane. Any faulty technique which results in a hazardous situation shall be disqualifying.

D. Seaplane Takeoffs

1. Description The applicant may be requested to demonstrate takeoffs into the wind, and with light crosswind components. He may also be asked to demonstrate, when feasible, or to describe in detail any or all of the following:

a. High-density altitude takeoffs from glassy water;

b. Takeoffs from choppy water or ocean swells; and

c. Takeoffs from streams or inlets with significant current or tide and downstream wind.

2. *Acceptable Performance Guidelines* The applicant's performance shall be evaluated on the basis of his smooth operation of the power and flight controls, directional control, and ability to achieve an efficient planing attitude promptly and to make a smooth, effective transition to flight. Misuse of the controls, consistent retarding of takeoffs by premature rotation for liftoff, or failure to take immediate corrective action to stop porpoising while on the step shall be disqualifying.

E. Seaplane Landings

1. Description The applicant may be asked to demonstrate landings into the wind, and with light crosswind components. Landing approaches should be made in accordance with the established traffic pattern for the area used, and with a final approach speed of approximately 1.3 times the power-off stalling speed in landing configuration (1.3 V_{so}), or the final approach speed recommended by the aircraft manufacturer. A straight course should be maintained during touchdown and throughout the runout on the surface. The applicant may also be asked to demonstrate, if feasible, or to describe in detail any of the following:

a. Landings on glassy water;

b. Landings on choppy water or ocean swells; and

c. Emergency landings on airports or unprepared fields.

2. *Acceptable Performance Guidelines* The applicant's performance shall be evaluated on the basis of the accuracy of his approaches, drift correction, correct use of the controls in flight and on the surface, and landing technique. He shall maintain the desired final approach speed within ±5 knots, and touch down smoothly within the area specified by the examiner.

VI. MANEUVERING BY REFERENCE TO INSTRUMENTS

Objective

To determine that the applicant is able to control and maneuver an airplane solely by reference to flight instruments as might be experienced under emergency conditions, and to use the emergency assistance available through radio aids, radar and DF (direction finding) heading instructions.

Procedures/Maneuvers

A. Basic Maneuvers

1. Description The applicant may be asked to demonstrate his ability to control and maneuver the airplane solely by reference to flight instruments while performing straight-and-level flight, turns, climbs and

descents, and while recovering from critical flight attitudes.

2. *Acceptable Performance Guidelines* The applicant's performance shall be evaluated on the basis of coordination, smoothness, and accuracy. He shall perform turns of at least 180° to within ±20° of a preselected heading, and climbs and descents to within ±100 ft. of a preselected altitude. If the examiner finds it necessary to take over to avoid a stall or to avoid exceeding the operating limitations of the airplane, the applicant shall be disqualified.

B. Use of Radio Aids

1. Description Under simulated instrument conditions the applicant may be asked to follow a VOR radial or "home" to a radio station using ADF (Automatic Direction Finder), as appropriate to the radio equipment in the airplane. No prescribed orientation procedure will be required.

2. *Acceptable Performance Guidelines* The applicant shall follow a radial or "home" to a station while effectively controlling altitude, heading, and airspeed.

C. Use of Radar or DF Heading Instructions

1. Description The applicant may be asked to demonstrate the proper procedures for contacting Approach Control or Flight Service Stations to request emergency assist-

ance. He should be able to follow radar or DF heading instructions while in simulated instrument conditions.

2. *Acceptable Performance Guidelines* The applicant's performance shall be evaluated on his ability to obtain and follow radar or DF heading instructions and emergency approach assistance received by radio, while effectively controlling altitude, heading, and airspeed.

VII. CROSS-COUNTRY FLYING

Objective

To determine that the applicant can prepare for and conduct a safe, expeditious cross-country flight.

Procedures/Maneuvers

A. Flight Planning

1. Description The applicant may be asked to plan a cross-country flight to a point at least 2 hours away at the cruising speed of the airplane used. At least one intermediate stop should be included. Planning should include the obtaining of pertinent and available weather information; plotting the course on an aeronautical chart; selecting checkpoints; measuring distances; and computing flight time, headings, and fuel requirements. The Airman's Information Manual should be used as a reference for airport information, NOTAMS, and such other ap-

propriate guidance as may be extracted from its contents.

2. Acceptable Performance Guidelines All flight planning operations shall be meaningful, accurate, and applicable to the trip proposed. The applicant shall explain his plan for the flight, verify his calculations, and present his sources of information and data.

B. Conduct of Planned Flight

1. Description The applicant may be asked to perform the planned flight using pilotage, dead reckoning, and VOR or ADF radio aids as appropriate to the equipment in the airplane. He should make good the desired track, determine position by reference to landmarks, and calculate estimated times of arrival over checkpoints. He may also be asked to intercept and follow a VOR radial or "home" to a radio station using ADF, recognize station passage, and determine position by means of cross bearings.

The applicant should set out on the cross-country flight which he had planned before takeoff. The planned course should be followed at least until the applicant establishes the compass heading necessary to stay on course, and can give a reasonable estimate of his groundspeed and time of arrival at his first point of intended landing.

2. Acceptable Performance Guidelines The applicant shall: (1) establish and maintain headings required to stay on course;

(2) correctly identify position; (3) provide reasonable estimates of times of arrival over checkpoints and destination with an apparent error of not more than 10 minutes; and, (4) maintain altitude within ±200 ft. of the planned altitude.

C. Diversion to an Alternate

1. Description When requested by the examiner to divert to an alternate airport, as might be necessary to avoid adverse weather, the applicant is expected to turn to the new course promptly. This may be accomplished by means of pilotage, dead reckoning, or radio navigation aids.

2. Acceptable Performance Guidelines The applicant shall. establish the appropriate heading for the course to the alternate and within a reasonable time give an acceptable estimate of the flying time and required fuel.

VIII. MAXIMUM PERFORMANCE TAKEOFFS AND LANDINGS

Objective

To determine that the applicant can use techniques appropriate to takeoffs and landings on short fields and on soft/rough fields.

Procedures/Maneuvers

A. Short-Field Takeoff and Maximum Climb

1. Description The applicant may be asked to demonstrate a takeoff from a simu-

lated short field with obstructions. He should apply power promptly and smoothly, and rotate to liftoff just as the best angle-of-climb airspeed is attained. He is expected to maintain that speed until the assumed obstructions have been cleared. The applicant is expected to know and understand the effectiveness of the best rate-of-climb and best angle-of-climb airspeeds of the airplane to obtain maximum climb performance. The flap settings and airspeeds prescribed by the airplane manufacturer should be used.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his planning, smoothness, directional control, and accuracy. In simulating a short-field takeoff, the liftoff and climb shall be performed within ± 5 knots of the best angle-of-climb speed.

B. Short-Field Landing

1. Description The applicant may be asked to demonstrate a landing from over an assumed 50-ft. obstruction using a final approach speed which will result in little or no floating after the throttle is closed during the flare for touchdown. The airplane should touch down within the area designated by the examiner, at minimum controllable airspeed. Upon touchdown, the applicant is expected to properly apply brakes to minimize the after-landing roll. Power, flaps, or moderate slips should be used as necessary on the last segment of the final approach.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his planning, coordination, smoothness, and accuracy. He shall control the angle of descent and airspeed on final approach so that floating is minimized during the flare. After touchdown, he shall bring the airplane smoothly to a stop within the shortest possible distance consistent with safety.

C. Soft-Field Takeoff

1. Description The applicant may be asked to demonstrate a takeoff from a simulated soft field. This should be accomplished with the wing at a relatively high angle of attack so as to transfer the weight from the wheels to the wing as soon as possible. The nosewheel or tailwheel should be lifted clear of the surface as soon as the elevators become effective. When liftoff occurs, the angle of attack should be reduced gradually with the wheels just clear of the surface until the best rate-of-climb airspeed is achieved. The flap setting used should be in accordance with the manufacturer's recommendations.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his planning, directional control, smoothness, and accuracy. The applicant shall lift off at a speed not higher than the power-off stalling speed and observe normal climb-out speed.

D. Soft-Field Landing

1. Description The applicant may be asked to demonstrate a landing from a normal approach with touchdown at the slowest possible airspeed to permit the softest possible touchdown and a short landing roll. A nose-high attitude should be maintained during the after-landing roll and the flaps promptly retracted (if recommended by the manufacturer) to prevent damage from mud or slush thrown by the wheels.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his planning, smoothness, and accuracy. He shall maintain the final approach airspeed within ±5 knots of that prescribed. *During flap retraction the applicant shall exercise extreme caution and maintain positive control.*

IX. NIGHT FLYING—NIGHT VFR NAVIGATION [2]

Objective

To determine that the applicant can properly prepare for a night flight and that he is thoroughly familiar with all aspects of night takeoffs and landings and night VFR cross-country flights.

[2] This pilot operation is not required if the applicant does not meet the night flying requirements set forth in Section 61.109. His certificate will bear the limitation, "Night Flying Prohibited".

Procedures/Maneuvers

A. Preparation and Equipment

1. Description The applicant may be asked to demonstrate how he would prepare for a local or cross-country night flight. This requires that he be familiar with: (1) airport lighting; (2) the airplane's lighting system and its operation; (3) the need for a personal flashlight; and, (4) the weather conditions pertinent to night flight. Particular attention should be given to the temperature/dewpoint spread due to the possibility of ground fog forming during night flights.

2. Acceptable Performance Guidelines The applicant shall explain the significance of the items peculiar to the preparation for night flights.

B. Takeoffs and Landings

1. Description An actual demonstration of takeoffs and landings at night may be required. If required, the applicant is expected to explain and demonstrate: (1) proper use of power during the approach and landing phase; (2) efficient use of landing lights; (3) safe climb and approach paths; (4) safe taxi speeds; (5) recognition of position relative to other aircraft by the location and color of their lights; and, (6) the dangers of spatial disorientation. If an actual demonstration is not required, the foregoing may be satisfied by oral quizzing.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of his ability to explain or demonstrate, as required by the examiner, the various techniques and aspects of night takeoffs and landings. He shall understand the importance of constant vigilance for other aircraft on the ground and in the air, and the precautions necessary to avoid wake turbulence and spatial disorientation.

C. VFR Navigation

1. Description An actual demonstration of night navigation may be required. If required, the applicant is expected to follow procedures similar to those described in this guide under "Cross-country Flying." If an actual night demonstration is not required, the foregoing may be satisfied by a daylight demonstration or oral quizzing.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of the Acceptable Performance Guidelines under "Cross-country Flying" in this guide, with special emphasis on the pecularities of night flying.

X. EMERGENCY OPERATIONS

Objective

To determine that the applicant can react promptly and correctly to emergencies which may occur during flight.

Procedures/Maneuvers

A. Partial or Complete Power Malfunctions

1. Description The applicant may be asked to demonstrate a knowledge of corrective actions for: (1) partial loss of power; (2) complete power failure; (3) rough engine; (4) carburetor ice; (5) fuel starvation; and (6) fire in the engine compartment. The examiner may, with no advance warning, reduce power to simulate engine malfunction.

2. Acceptable Performance Guidelines Performance shall be evaluated on the applicant's prompt analysis of the situation and on his remedial course of action. He shall perform the emergency procedures in compliance with the manufacturer's published recommendations. Any action which creates unnecessary additional hazards shall be disqualifying.

B. Systems or Equipment Malfunctions

1. Description The applicant may be asked to demonstrate a knowledge of corrective actions for: (1) inoperative electrical system (generator, alternator, battery or circuit breaker); (2) electrical fire or smoke in cockpit; (3) gear or flap malfunctions; (4) door opening in flight; and (5) inoperative elevator trim tab. Where practicable, the examiner may, with no advance warning, simulate flap malfunctions, landing gear malfunctions, or an inoperative electrical system.

The applicant is expected to perform emergency procedures for the simulated malfunction.

2. *Acceptable Performance Guidelines* Performance shall be evaluated on the applicant's prompt analysis of the situation and his remedial course of action. He shall perform the emergency procedures in compliance with the manufacturer's published recommendations. Any action which creates unnecessary additional hazards shall be disqualifying.

C. Lost Procedures

1. Description The applicant may be asked to explain the proper courses of action to be taken in the event he becomes lost, is trapped on top of an overcast, loses radio communications, or encounters unanticipated adverse weather.

2. *Acceptable Performance Guidelines* Performance shall be evaluated on the applicant's ability to promptly and correctly analyze the situation and describe the appropriate remedial action.

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